Indicator: Infectious Gastrointestinal and Arthropod-Borne Disease Prevalence (083-089)

The two broad infectious disease categories included here are those whose appearance and spread may be influenced to some extent by environmental conditions and change. First, seven notifiable gastrointestinal diseases caused by microorganisms are discussed below including: cholera, cryptosporidiosis, *Escherichia coli* (*E. Coli*) O157:H7, Hepatitis A, salmonellosis, shigellosis, and typhoid fever. The major environmental source of gastrointestinal illness is water or food that is contaminated with pathogenic microorganisms. The primary means of transmission for these seven diseases is through ingestion of contaminated food/water or through contact and accidental ingestion of fecal matter (CDC, 2005).

Next, three arthropod-borne diseases are detailed including: Lyme disease (transmission of Borrelia burgdorferi by ticks), Rocky Mountain Spotted fever (transmission of Rickettsia rickettsii by ticks), and West Nile virus (transmitted by mosquitoes).Certain ticks and mosquitoes (arthropods) can carry bacteria and viruses that cause disease in humans. The arthropods acquire the bacteria or viruses when they bite an infected mammal or bird. In recent years, both Lyme disease and West Nile virus have spread across the United States (CDC, 2004). Some studies indicate that spread of vector-borne disease may be influenced by land use and/or other environmental change (CDC, 2004).

This indicator reflects occurrence of the ten aforementioned notifiable diseases as reported by health departments to the National Notifiable Diseases Surveillance System. Data is collected by all 50 states, five territories, New York City, and the District of Columbia, based on a list of recommended Nationally Notifiable Infectious Diseases, and compiled nationally. The temporal coverage of the data varies by disease.

What the Data Show

Figure 083-089GI presents the number of reported cases for each of the seven notifiable gastrointestinal diseases from 1997-2003. Very few cases of cholera were reported yearly with only two cases reported in 2003. Like cholera, typhoid fever has a relatively low prevalence. In 2003, 356 cases of typhoid fever were reported, comparable to the number of reported cases in years past. Hepatitis A has continued to decline, where in 1999 17,047 cases were reported compared to 7,653 cases in 2003. No notable trends are revealed for cryptosporidiosis, *E. Coli* O157:H7, salmonellosis, and shigellosis, but under-reporting has probably occurred because of milder cases not being diagnosed or reported.

Figure 083-089Arthropod presents the number of reported cases for three arthropod-borne diseases. Surveillance for Lyme disease was initiated by the Centers for Disease Control (CDC) in 1982 (CDC 1993). Lyme disease is the most commonly reported arthropod-borne disease in the United States with 21,273 cases reported in 2003, a decrease from the record number reported in 2002 (23,763 cases). CDC began surveillance of Rocky Mountain Spotted fever in 1970. From 1999 to 2002 a steady increase in the number of reported cases of Rocky Mountain spotted fever occurred. However a slight decrease in the number of cases were reported in 2003 (1,091 cases) compared to 2002 (1,104 cases). Cases of West Nile virus were first documented in the United States in 1999 (CDC, 2000). A total of 80 cases were reported in 1999 (62 cases) and 2000 (18 cases). West Nile virus became nationally reportable in 2002, and the number of reported cases rose from 2,840 in 2002 to 2,866 in 2003.

Indicator Limitations

- State epidemiologists report cases of notifiable diseases to CDC and policies for reporting can vary by disease or reporting jurisdiction.
- Reporting nationally notifiable diseases to CDC is voluntary. The degree of completeness of data reporting is influenced by many factors such as the diagnostic facilities available, the control

measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance.

- Factors such as changes in case definitions for public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease (CDC, 2004).

Data Sources

Centers for Disease Control and Prevention (CDC). Summary of Notifiable Diseases—United States, Web-link for overview page: http://www.cdc.gov/epo/dphsi/annsum/index.htm.

CDC. 2001. Summary of Notifiable Diseases—United States, 1999. Volume 48:53. April 6, 2001. http://www.cdc.gov/mmwr/PDF/wk/mm4853.pdf. See Table 1.

CDC. 2002. Summary of Notifiable Diseases—United States, 2000. Volume 49:53. June 14, 2002. http://www.cdc.gov/mmwr/PDF/wk/mm4953.pdf. See Table 1.

CDC. 2003. Summary of Notifiable Diseases—United States, 2001. Volume 50:53. May 2, 2003. http://www.cdc.gov/mmwr/PDF/wk/mm5053.pdf. See Table 1.

CDC. 2004a. Summary of Notifiable Diseases—United States, 2002. Volume 51:53. April 30, 2004. http://www.cdc.gov/mmwr/PDF/wk/mm5153.pdf. See Table 1.

CDC. 2004b. Final 2003 Report of Notifiable Diseases. Volume 53:30. August 6, 2004. http://www.cdc.gov/mmwr/PDF/wk/mm5330.pdf. See Table 2.

References

Centers for Disease Control and Prevention (CDC). 1993. MMWR Weekly. Volume 42:18. May 14, 1993. http://www.cdc.gov/mmwr/preview/mmwrhtml/00020506.htm.

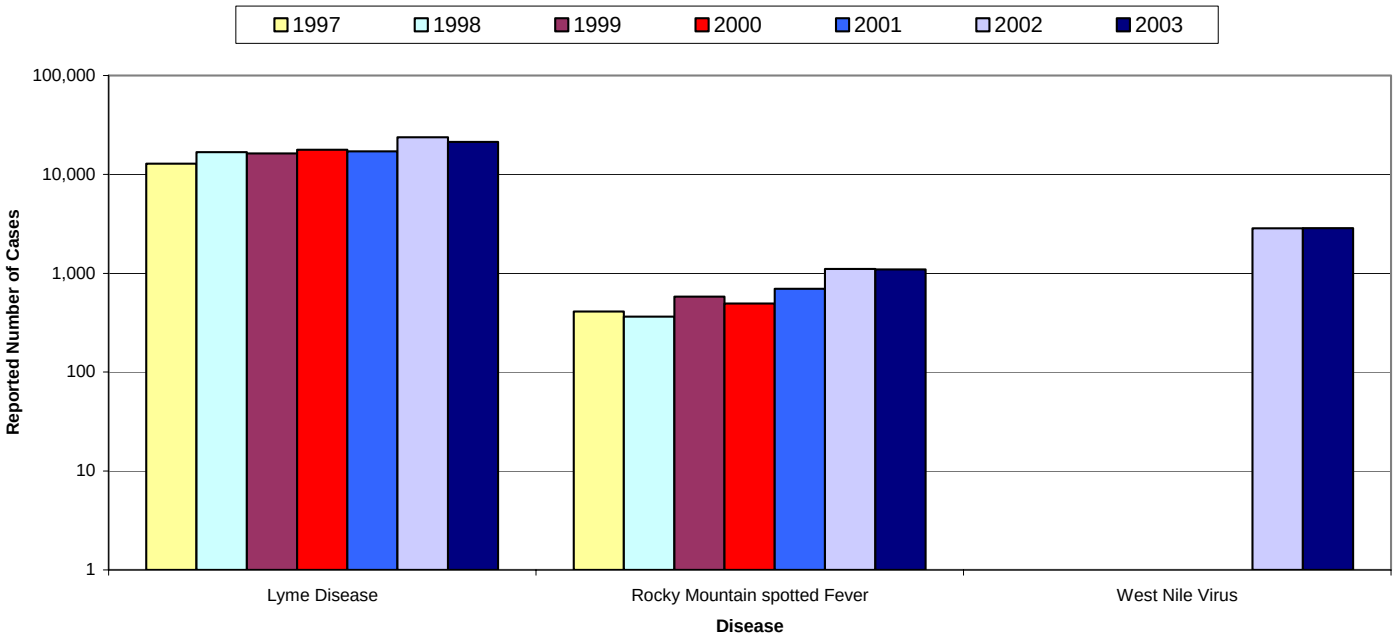
Centers for Disease Control and Prevention (CDC). 2000. Update: West Nile virus activity – Eastern United States, 2000. Morbidity and Mortality Weekly Report 49 (46):1044-47.

Centers for Disease Control and Prevention (CDC). 2004. Summary of Notifiable Diseases—United States, 2002. Volume 51:53. April 30, 2004. http://www.cdc.gov/mmwr/PDF/wk/mm5153.pdf See Table 1.

Centers for Disease Control and Prevention (CDC). 2005. Foodborne Illness – Frequently Asked Questions (Accessed April 11, 2005) http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm#howdiagnosed

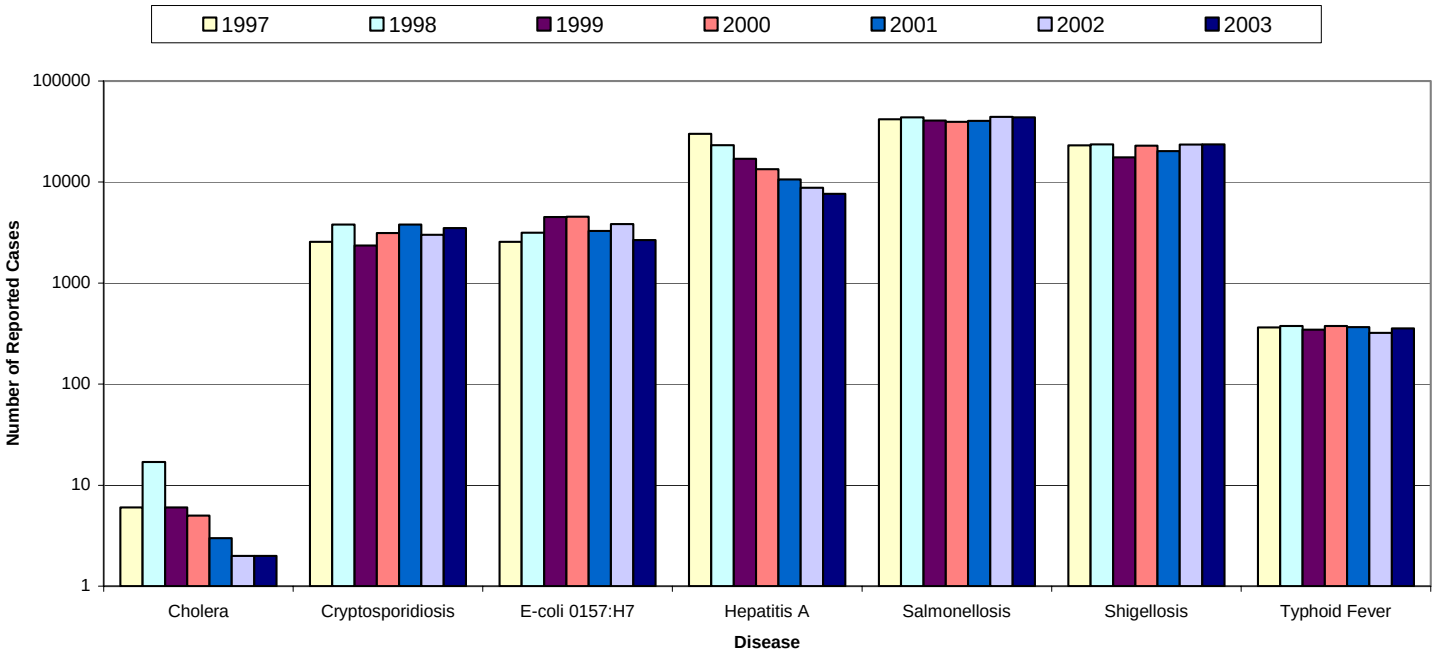
Graphics

Figure 083-089Arthropod: Prevalence of Reported Arthropod-borne Diseases in the United States, 1997—2003



Source:
CDC. 2002. Summary of Notifiable Diseases—United States, 2000. Volume 49:53. June 14, 2002.
http://www.cdc.gov/mmwr/PDF/wk/mm4953.pdf. See Table 8 (1997-2000).
CDC. 2003. Summary of Notifiable Diseases—United States, 2001. Volume 50:53. May 2, 2003.
http://www.cdc.gov/mmwr/PDF/wk/mm5053.pdf. See Table 1.
CDC. 2004. Summary of Notifiable Diseases—United States, 2002. Volume 51:53. April 30, 2004.
http://www.cdc.gov/mmwr/PDF/wk/mm5153.pdf. See Table 1.
CDC. 2004. Final 2003 Report of Notifiable Diseases. Volume 53:30. August 6, 2004.
http://www.cdc.gov/mmwr/PDF/wk/mm5330.pdf. See Table 2.

Figure 083-089GI: Prevalence of Reported Gasrointestinal Diseases in the United States, 1997—2003



Source:
CDC. 2002. Summary of Notifiable Diseases—United States, 2000. Volume 49:53. June 14, 2002.
http://www.cdc.gov/mmwr/PDF/wk/mm4953.pdf. See Table 8 (1997-2000).
CDC. 2003. Summary of Notifiable Diseases—United States, 2001. Volume 50:53. May 2, 2003.
http://www.cdc.gov/mmwr/PDF/wk/mm5053.pdf. See Table 1.
CDC. 2004. Summary of Notifiable Diseases—United States, 2002. Volume 51:53. April 30, 2004.
http://www.cdc.gov/mmwr/PDF/wk/mm5153.pdf. See Table 1.
CDC. 2004. Final 2003 Report of Notifiable Diseases. Volume 53:30. August 6, 2004.
http://www.cdc.gov/mmwr/PDF/wk/mm5330.pdf. See Table 2.

R.O.E. Indicator QA/QC

Data Set Name: INFECTIOUS GASTROINTESTINAL AND ARTHROPOD-BORNE DISEASE PREVALENCE
Indicator Number: 083 (89115)
Data Set Source: CDC
Data Collection Date: ongoing
Data Collection Frequency: yearly
Data Set Description: Infectious Gastrointestinal and Arthropod-Borne Disease Prevalence (combines former 083, 084, 085, 086, 087, 088, 089)
Primary ROE Question: What are the trends in human disease and conditions for which environmental pollutants are thought to be to risk factors including across population subgroups and geographic regions?

Question/Response

T1Q1 Are the physical, chemical, or biological measurements upon which this indicator is based widely accepted as scientifically and technically valid?

The Epidemiology Program Office (EPO) of CDC, in partnership with the Council of State and Territorial Epidemiologists (CSTE), operates the National Notifiable Diseases Surveillance System. The purpose of this system is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by CSTE. The system also provides summary data on an annual basis. State epidemiologists report cases of notifiable diseases to EPO, and EPO tabulates and publishes these data in the Morbidity and Mortality Weekly Report (MMWR) and the Summary of Notifiable Diseases, United States (entitled Annual Summary before 1985). Notifiable disease surveillance is conducted by public health practitioners at local, State, and national levels to support disease prevention and control activities. Notifiable disease reports are received from health departments in the 50 States, five territories, New York City, and the District of Columbia.

T1Q2 Is the sampling design and/or monitoring plan used to collect the data over time and space based on sound scientific principles?

In the United States, requirements for reporting diseases are mandated by state laws or regulations, and the list of reportable diseases in each state differs. In October 1990, in collaboration with the Council of State and Territorial Epidemiologists, CDC published a report entitled Case Definitions for Public Health Surveillance, which, for the first time, provided uniform criteria for reporting cases. The 1990 Report was revised and published in 1997 to provide updated uniform criteria for state health department personnel to use when reporting notifiable diseases to CDC. The 1997 updates were published in a report entitled Case Definitions for Infectious Conditions Under Public Health Surveillance (ftp://ftp.cdc.gov/pub/Publications/mmwr/rr/rr4610.pdf).

T1Q3 Is the conceptual model used to transform these measurements into an indicator widely accepted as a scientifically sound representation of the phenomenon it indicates?

Yes. Data collected is published weekly in the CDC s Morbidity and Mortality Weekly Report (MMWR)

T2Q1 To what extent is the indicator sampling design and monitoring plan appropriate for answering the relevant question in the ROE?

Data is collected at the state level, based on a list of recommended Nationally Notifiable Infectious Diseases, and compiled nationally. The temporal coverage of the data is from 1997-2003.

T2Q2 To what extent does the sampling design represent sensitive populations or ecosystems?

This is national data; sensitive populations are included to the extent that they are seen, reported or treated by a reporting official.

T2Q3 Are there established reference points, thresholds or ranges of values for this indicator that unambiguously reflect the state of the environment?

Not applicable

T3Q1 What documentation clearly and completely describes the underlying sampling and analytical procedures used?

Reporting is performed by state health departments, which submit data to CDC through an electronic system described at http://www.cdc.gov/epo/dphsi/netss.htm. Additional documentation is available at ftp://ftp.cdc.gov/pub/Publications/mmwr/rr/rr4610.pdf. Table HH2 data source: Source: Centers for Disease Control and Prevention (CDC). Summary of Notifiable Diseases United States, Web-link for overview page: http://www.cdc.gov/epo/dphsi/annsum/index.htm. CDC. 2001. Summary of Notifiable Diseases United States, 1999. Volume 48:53. April 6, 2001. http://www.cdc.gov/mmwr/PDF/wk/mm4853.pdf. See Table 1. CDC. 2002. Summary of Notifiable Diseases United States, 2000. Volume 49:53. June 14, 2002. http://www.cdc.gov/mmwr/PDF/wk/mm4953.pdf. See Table 1. CDC. 2003. Summary of Notifiable Diseases United States, 2001. Volume 50:53. May 2, 2003. http://www.cdc.gov/mmwr/PDF/wk/mm5053.pdf. See Table 1. CDC. 2004. Summary of Notifiable Diseases United States, 2002. Volume 51:53. April 30, 2004. http://www.cdc.gov/mmwr/PDF/wk/mm5153.pdf. See Table 1. CDC. 2004. Final 2003 Report of Notifiable Diseases. Volume 53:30. August 6, 2004. http://www.cdc.gov/mmwr/PDF/wk/mm5330.pdf. See Table 2.

T3Q2 Is the complete data set accessible, including metadata, data-dictionaries and embedded definitions or are there confidentiality issues that may limit accessibility to the complete data set?

Weekly summaries of the data are published in the CDC s Morbidity and Mortality Weekly Report (http://www.cdc.gov/mmwr/). Annual summaries are available at http://www.cdc.gov/epo/dphsi/annsum/index.htm.

T3Q3 Are the descriptions of the study or survey design clear, complete and sufficient to enable the study or survey to be reproduced?

See T3Q1

T3Q4 To what extent are the procedures for quality assurance and quality control of the data documented and accessible?

Quality assurance information, as well as case definitions of the infectious diseases reported, is available at http://www.cdc.gov/epo/dphsi/casedef/index.htm.

T4Q1 Have appropriate statistical methods been used to generalize or portray data beyond the time or spatial locations where measurements were made (e.g., statistical survey inference, no generalization is possible)?

Not applicable

T4Q2 Are uncertainty measurements or estimates available for the indicator and/or the underlying data set?

Not applicable

T4Q3 Do the uncertainty and variability impact the conclusions that can be inferred from the data and the utility of the indicator?

Not applicable

T4Q4 Are there limitations, or gaps in the data that may mislead a user about fundamental trends in the indicator over space or time period for which data are available?

Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction, depending on case status classification (i.e., confirmed, probable, or suspect). CSTE and CDC annually review the status of national infectious disease surveillance and recommend additions or deletions to the list of nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and State level. Therefore, the list of diseases that are considered notifiable varies slightly by State. The degree of completeness of data reporting also is influenced by the diagnostic facilities available; the control measures in effect; public awareness of a specific disease; and the interests, resources, and priorities of State and local officials responsible for disease control and public health surveillance. Finally, factors such as changes in case definitions for public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease. The degree of completeness of data reporting also is influenced by the diagnostic facilities available; the control measures in effect; public awareness of a specific disease; and the interests, resources, and priorities of State and local officials responsible for disease control and public health surveillance. Finally, factors such as changes in case definitions for public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.